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Status of the Seabirds of the Culebra Archipelago, Puerto Rico

SEAN FURNISS

Caribbean Islands National Wildlife Refuges, U.S. Fish and Wildlife Service,
P.O. Box 510, Boqueron, Puerto Rico 00622

Abstract.—In the eleven years since the last study (1970-71) of Culebra's seabirds several significant changes in population numbers, colony site locations, and breeding species have occured. The Sooty Tern (*Sterna fuscata*) population has declined 82%; the Royal Tern (*S. maxima*) and Sandwich Tern (*S. sandvicensis*) populations have shifted their major breeding colony and their populations have declined, and three additional species—Masked Booby (*Sula dactylatra*), Red-footed Booby (*S. sula*), and Audubon's Shearwater (*Puffinus lherminieri*)—have been found breeding in the Culebra Archipelago.

Key words: Seabirds, Population status, Culebra, Puerto Rico, Carribean, *Puffinus lherminieri, Phaethon lepturus, P. aethereus, Sula leucogaster, S. dactylatra, S. sula, Larus atricilla, Sterna maxima, S. sandvicensis, S. dougalli, S. anaethetus, S. fuscata, Anous stolidus, Rynchops niger.*

The Culebra Archipelago is located 37 km east of Fajardo, Puerto Rico and 25 km west of St. Thomas, United States Virgin Islands (Fig. 1). The climate is arid (rainfall averages 908 mm) and the evapotransporation rate exceeds precipitation. The vegetation is classified as subtropical dry forest (Ewel & Whitmore 1973) although it is greatly modified in much of the area. The islands in the Archipelago, 18 cays and islands surrounding the island of Culebra (Fig. 2), were described by Kepler & Kepler (1978).

The cays and islands in the group harbor substantial seabird colonies. These colonies were first described by Kepler & Kepler (1978) from a study conducted primarily in 1971, when the archipelago still served as a bombing practice range for the U.S. Navy. The Navy left the islands in 1975, and administrative control of most of the seabird areas passed to the U.S. Fish and Wildlife Service (FWS). The remaining seabird nesting area of major consequence, Peninsula Flamenco, came under FWS jurisdiction in March 1982.

METHODS

From June 1980 through October 1982, the islands were visited eight times in a cooperative program between the FWS and the Puerto Rico Department of Natural Resources (DNR) to determine the current status of the seabird colonies and compare it with the Keplers' study. Twenty days were spent conducting surveys using methods similar to those described by the Keplers' (1978). Population estimates were made during the breeding season for each species. Generally, estimates were based on sight counts of adult birds, but nest counts

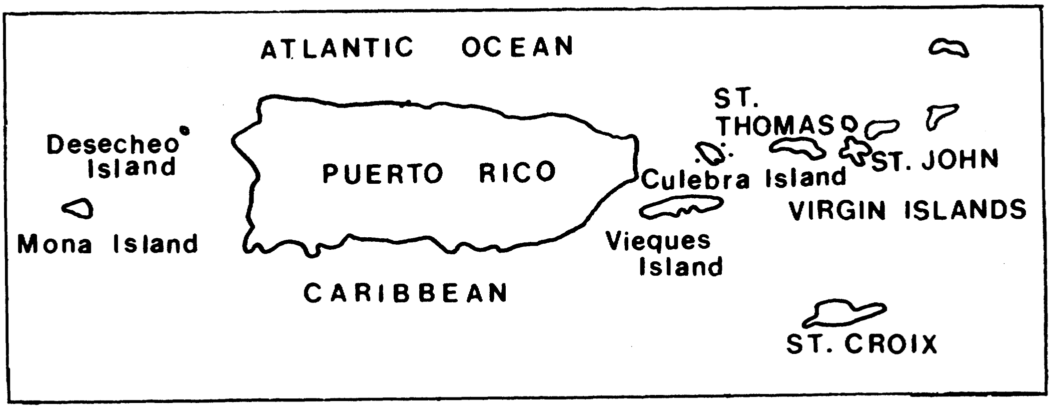

Fig. 1. Puerto Rico and the U. S. Virgin Islands.

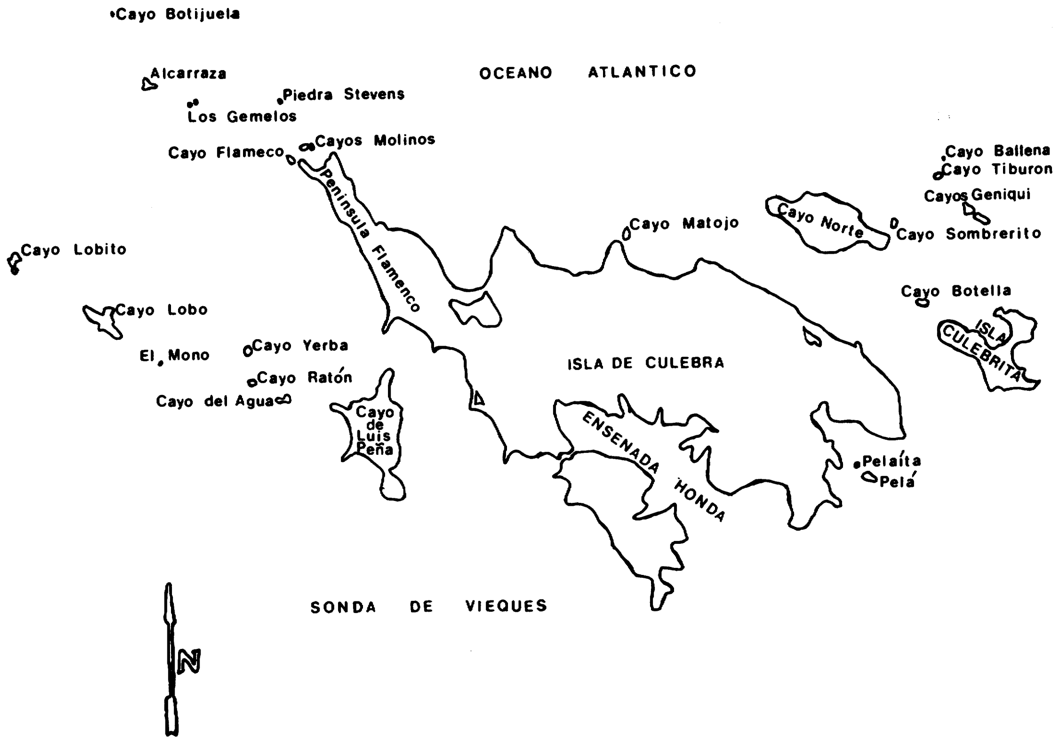

Fig. 2. Culebra and adjacent islands.

at major colonies were also used to estimate size of the populations.

SPECIES ACCOUNTS

Audubon's Shearwater (Puffinus lherminieri)

In June 1980, FWS biologists Jim and Beth Wiley found a single bird in a small crevice on Cayo del Agua. At the base of a rocky outcropping, about 20 m from the live bird, J. Wiley and I found a complete skeleton, with all attached remiges one-third to one-half erupted from the sheaths. This is believed to be the only recent observation of the species made on land and the first record of nesting in Puerto Rico. Barnés (1946) reported observing this species on many occasions at Mona Island but no reports concerning nesting were made. In the U.S. Virgin Islands this species nests at Saba, Cockroach, Sula, and Frenchcap Cays. Erdman (1967) reported seeing Audubon's Shearwaters feeding 5 miles northwest of Christiansted, St. Croix.

White-tailed Tropicbird (Phaethon lepturus)

The estimated population of about 20 pairs remains unchanged since 1970-71. This estimate is based upon observations of adults around the islands and counts of nests at Cayo Luis Peña. I found 9 adults incubating eggs at Luis Peña in March 1981 and 13 in April 1982. All nests were on the west (leeward) side of the island, loosely clumped in boulders, and 1 to 4 m above sea level. The nests were located in the same area where nests were collected in 1912 (Wetmore 1917) and birds nested in 1971 (Kepler & Kepler 1978). Chicks seen in June 1981 varied in development from downy to ready-to-fledge. No chicks could be found in June 1982. No nest searches were conducted at locations other than Luis Peña.

Red-billed Tropicbird (Phaethon aethereus)

The population of this species continues to be approximately 40 pairs. This estimate is based solely on the sightings of adults; no nest searches were made. The only nest found during this study period was located in March 1981 on the east (windward) side of the north island of Cayos Geniqui, about 15 m above sea level.

Masked Booby (*Sula dactylatra*)

The first record for Culebra was the sighting of nesting adults on the top of the south island of Cayos Geniqui in June 1978 when DNR biologists David Belitsky and Julio Cardona found three Masked Boobies on nests. Adult birds were seen on the top of Alcarraza by DNR biologist Jaime Collazo in September 1980 and by DNR biologist José Colón and me in June 1981; five to seven individuals were observed each time. I observed seven adults from the air in February 1982. In June 1982 Collazo and I found one egg, two chicks and seven adults on Alcarraza. The Culebra breeding records are the second known from Puerto Rico and the sites are 33 km west of the nearest Masked Booby colony located at Cockroach Cay, U. S. Virgin Islands and 274 km east of the colony at Monito Island, Puerto Rico.

Brown Booby (*Sula leucogaster*)

The Keplers' (1978) estimated a breeding Brown Booby population of 75 pairs at Cayos Geniqui. This was likely an underestimation because their surveys missed the peak of the breeding season in September. DNR biologists recorded 180 nests in September 1980, 179 nests (148 with eggs, 31 with chicks) in September 1981, and 206 nests (109 with eggs, 97 with chicks) in October 1982. During the study, eggs were found from September through March and young were found September through June. The breeding cycle of the Culebra population is similar to that of the Monito Island population, with a peak of breeding occurring in September and being much reduced in May, June, and July (Kepler 1978). The Culebra colony still suffers from exploitation by poachers. Unrusted, expended shotgun shells, unused plastic bags and unrusted metal containers were encountered regularly on the nesting plateaus.

Red-footed Booby (*Sula sula*)

In September 1980, Collazo found three white phase adults with nests, each containing a single egg, in *Ficus* trees on the south island of Cayos Geniqui. In March 1981 I located three active nests: one with a small chick and two with unattended, ready-to-fledge chicks. In September 1981 Collazo found six active nests, five with dark phase adults and one with a white phase adult. In June 1982, Collazo and I observed one chick and in October 1982 Collazo found three active nests, one with an egg and two with a single downy young each. This is the first Red-footed Booby nesting reported for eastern Puerto Rico. The Red-footed Booby colony at Frenchcap Cay, U.S. Virgin Islands, located 42 km to the east, is the nearest active colony to Cayos Geniqui. The other three colonies in Puerto Rico are at Desecheo Island, Mona Island, and Monito Island located 237, 278 and 288 km, respectively, west of Cayos Geniqui.

Laughing Gull (*Larus atricilla*)

The Keplers' (1978) estimated that there were 645 pairs of Laughing Gulls in four colonies in June 1971. I estimated the population to be 650 pairs in three colonies (Cayos Lobito, Matojo, and Geniqui) in June 1981, and 405 pairs in June 1982. The Cayo Lobito colony is the major Laughing Gull colony in Puerto Rico but appears to have decreased about 175 pairs (38%), possibly due to successional changes at Lobito.

Royal Tern (*Sterna maxima*)

In June 1971, 120 pairs of Royal Terns were reported nesting on Cayo Lobito and 35 pairs were reported from Cayo Matojo (Kepler & Kepler 1978). During June 1981, five nests were seen on Lobito and 100 pairs were estimated on Matojo (32% fewer than in 1971); and in June 1982, 16 nests were found on Lobito and 104 nests counted on Matojo (23% fewer than in 1971). The shift of the major colony site from Lobito to Matojo is likely due to vegetative encroachment on the formerly exposed ground nesting areas on Lobito.

Sandwich Tern (*Sterna sandvicensis*)

The Keplers' (1978) found 700 pairs of

Sandwich Terns on Cayo Lobito and 35 pairs on Cayo Matojo during June 1971. In contrast, during June 1981 I found 20 nests on Lobito and an estimated 400 breeding pairs on Matojo, and in June 1982 found no nests on Lobito and 139 on Matojo. As with the Royal Terns, the major breeding site has shifted from Lobito to Matojo. In Puerto Rico this species, which breeds only in Culebra, has undergone a major population decline (–81%) in the last 11 years. A reduction of suitable nesting habitat due to increased vegetative cover may be a major factor in its decline.

Roseate Tern (*Sterna dougallii*)

Kepler & Kepler (1978) reported 250 pairs of "Common Terns" (later identified as Roseate Terns by Nisbet 1980) on Cayos Molinos and 75 pairs on Cayo Ratón. On Molinos an estimated 200 pairs were present in June 1981 and 242 nests were counted in June 1982. Ratón was not used by Roseate Terns in 1981 or 1982.

Bridled Tern (*Sterna anaethetus*)

I estimated the population for all Culebra breeding sites to be 975 Bridled Terns in June 1981 and 900 in June 1982; a 25 to 35% increase from the 720 individuals reported in 1971 (Kepler & Kepler 1978). Most of the increase may have been related to a new colony at Cayo Alcarraza, where an estimated 200 individuals were found breeding.

Sooty Tern (*Sterna fuscata*)

Population estimates for this species in the Culebra Archipelago were 30,000 Sooty Terns in June 1980, 18,000 in June 1981 and 30,000 in June 1982. During 1971 the Sooty Tern population was estimated to be about 167,000 individuals, mainly concentrated in two colonies: Cayo Yerba (about 36,000) and Peninsula Flamenco (about 130,000) (Kepler & Kepler 1978). After the departure of the U.S. Navy in 1975, uncontrolled cattle pasturing on Peninsula Flamenco resulted in severe overgrazing and loss of nesting habitat, and the Keplers' (1978) reported egg taking rapidly escalated with sacks of eggs being taken and openly sold in the local community. A short stretch of fence placed on the northwest corner of Peninsula Flamenco in 1976 was all that kept the last 16 percent (3 ha) of the Peninsula Flamenco Sooty Tern habitat from being grazed out of existence. In 1980, Peninsula Flamenco was not used for an unknown reason, but birds nested there in 1981 and 1982. It appeared that part of the Peninsula Flamenco colony shifted to Cayo del Agua in 1980, where Sooty Terns had attempted to nest in 1971 but could not due to Navy bombing practice (Kepler & Kepler 1978). The Cayo del Agua site was used only in 1980; birds banded at this site were recaptured at Peninsula Flamenco in June 1981 and June 1982. Birds banded on Cayo Yerba have been recaptured on Peninsula Flamenco, indicating that shifts also occur between these two sites. Additionally there is intermixing with Sooty Terns of the Dry Tortugas in Florida (Robertson *et al.* 1983). One chick banded on the Dry Tortugas was recaptured as a breeding adult in Culebra and a Culebra chick was recaptured in the year after banding in the Dry Tortugas.

Brown Noddy (*Anous stolidus*)

The Brown Noddy population was estimated in 1971 to be about 1,100 individuals (Kepler & Kepler 1978). Estimates for June 1981 and June 1982 were 1100, and 1400 birds, respectively. Colonization of Alcarraza resulted in the apparent increase in the population.

Non-breeding Species

The Black Skimmer (*Rynchops niger*) was added to the list of non-breeding birds of the Culebra Archipelago in March 1981. Two individuals of this species were reported at Cayo Luis Peña by DNR Rangers and I sighted them there on 10 March 1981. Raffaele (1983) considers this species to be a rare transient in Puerto Rico (six previous records) and the Virgin Islands (three records).

DISCUSSION

Major changes to the various breeding colonies in the Culebra Archipelago are attributable to vegetative succession, increased human intrusion, and cessation of target bombing. The departure of the U.S. Navy from Culebra in 1975 and the resulting vegetative and human use changes had both positive and negative impacts on seabirds. The lack of vegetative disturbance on Cayo Lobito has resulted in the covering of bare ground by vines, and the island becoming very brushy. Decreased numbers of Laughing Gulls, a decrease and relocation of Sandwich Terns, and a relocation of the Royal Terns has resulted. With the termination of bombing at Alcarraza, sedges (*Cyperus planifolicus*) began colonizing the once barren island, and Masked Boobies, Brown Noddies and Bridled Terns began nesting. Withdrawal by the Navy from the island of Culebra resulted in cattle overgrazing Peninsula Flamenco. The unregulated grazing caused serious degradation of the plant community and soil resources. Loss of the grassy cover used by the Sooty Terns, on Peninsula Flamenco, was nearly 100% and encroachment of the area by exotic thornscrub was extensive. The Sooty Tern population dropped 82%, a loss of about 137,000 birds. Those species nesting on rock (boobies, tropicbirds, Noddy Terns, Roseate Terns, Bridled Terns) maintained a fairly stable population or increased between 1971 and 1982, while those species nesting on bare soil and in vegetation (Sooty Terns, Royal Terns, Sandwich Terns, Laughing Gulls) experienced population declines.

With the incorporation of Peninsula Flamenco into the Culebra National Wildlife Refuge in March 1982, recovery of the Sooty Tern to former population levels may be possible. The assignment of a full time refuge manager to Culebra in November 1982 marked the beginning of active management. Elimination of grazing and appropriate vegetative manipulation on Peninsula Flamenco will aid in the recovery of the Sooty Tern population, and vegetative manipulation on Cayos Matojo and Lobito should assist in the recovery of Royal Tern, Sandwich Tern, and Laughing Gull populations.

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